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ABSTRACT

A geographically-based, random sample of 62 children, balanced for child gender, and their mothers who met selection criteria were observed and interviewed to determine the correlates of rural children's mental development. It was hypothesized that rural children's intellectual development would be positively correlated with a number of ecological home factors including the quality of the child's home environment, parental education and social class, and inversely correlated with maternal alienation. The criteria for selecting the sample were (1) proximity to a randomly selected geographic point within each of 12 randomly selected non-urban counties; (2) intact two-parent families with children aged 3, 6, or 9 years; (3) derived some income from their farm of at least 10 acres; and (4) had lived on a farm for at least 5 years prior to the study. The analysis revealed that while the educational/developmental quality of the children's home environment was linked to the development of intelligence in both the 3-year-old and 9-year-old subjects, maternal alienation was only linked with effects on the older children. The linkage of maternal alienation for the older subjects, but not the younger, suggested variations in environmental influences on cognitive performance during a child's lifespan. (HOD)

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Home Environment and Maternal Alienation: Longitudinal Effects on Rural Children's Intellectual Functioning: A Cross-Lagged Analysis

Research Report

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Home Environment and Maternal Alienation: Longitudinal Effects on Rural Children's Intellectual Functioning: A Cross-Lagged Analysis

A number of factors have been identified as correlates of young children's cognitive development. These factors have often included the quality of the child's home environment, parental education and social class, and maternal alienation. While the former factors have been repeatedly documented, there is little evidence for the latter factor.

The quality of infants' home environments, assessed during the first two years with the Home Observation for Measurement of the Environment (HOME), was a predictor of both their later Stanford-Binet IQ scores at 36 months (Elardo, Bradley and Caldwell, 1975) as well as at 54 months (Bradley and Caldwell, 1976). Social class differences in children's intellectual development have been noted recently for 4-year-old (Murphy and Wilkinson, 1982) as well as 8-, 10-, and 12-year-old children (Globerson, 1983). Murphy and Wilkinson found significant social class differences favoring higher SES children for both the intelligence and language test scores of 4-year-old children. Globerson also found significant social class effects for the WISC-R Vocabulary and Similarities subtest scores for the older children. The importance of socioeconomic status differences and mediating environmental influences on cognitive development has been previously noted in a review article by Deutsch (1973). White, Kaban, Attanucci and Shapiro (1978) found a correlation of

+.55 between 3-year-old children's linguistic and intellectual skills and their parent's socioeconomic status index. IQ differences of more than 20 points have been reported between members of contrasting social classes. Scarr and Weinberg (1976) studied 176 children, mostly black, who were adopted into white, upper middle-class families. The children's biological parents had high school degrees, but their adoptive parents were well-educated and held professional jobs. The children's IQ scores increased up to 10-20 points, and the earlier the children were placed in their adoptive homes, the more their IQ increased. Social class also influences birth order effects. The adverse effects of family size on sixth-graders' intellectual functioning were shown to be greater for middle- to lower-class families than for upper-class families (Lancer and Rim, 1984).

Maternal alienation, associated with felt isolation, may also influence children's cognitive development. In maladaptive family patterns and disturbed processes of child development, family isolation was shown to be a factor (Parke and Collmer, 1975). Felt maternal isolation (alienation) in rural women was affected by maternal education, community involvement, and family income (Poresky and Atilano, 1982).

In a broad study of infant's mental development, Poresky and Henderson (1982) found significant correlations between measures of the quality of toddlers' home environments, maternal attitudes, and socioeconomic status with the toddlers' Bayley Mental Development Index and also their Psychomotor Development Index at 24 months. There were many significant

intercorrelations between the antecendant variables, but when the quality of the toddler's home environments was controlled the other correlated factors were not found to be significant additional contributors to the toddlers' mental development scores.

These findings and the lack of comparable research on rural children's mental development lead to this broad-scale study of the correlates of rural children's mental development. While many of the longitudinal correlates of young urban children's mental development have been identified, less is known about the correlates of rural children's mental development. This study addressed this deficiency by examining the hypothesis that rural children's intellectual development is positively correlated with a number of ecological home factors including the quality of the child's home environment, parental education, social class, and inversely with maternal alienation.

Method

SAMPLE: A geographically-based, random sample yielded 62 target children, balanced for child gender, and their mothers who met the selection criteria and agreed to participate. The selection criteria were: (1) proximity to a randomly selected geographic point within each of 12 randomly selected non-urban counties; (2) intact two-parent families with children of the appropriate age (3, 6 or 9 years); (3) derived some income from their farm of at least 10 acres, and; (4) had lived on a farm for at least 5 years prior to the study. Children with obvious handicaps were not included. Initial contact and screening was

conducted by telephone. The husband's average age was 36.58 years (SD = 6.55), and the wife's was 34.07 years (SD =5.34). Husband's mean educational accomplishment was 13.68 years (SD = 2.39) and the wive's was 13.25 years (SD = 1.87).

INSTRUMENTS: The Kansas Home Interview Scales were developed as an interview / observational measure of the child's ecology by the author and the NC-124 Regional Research Committee (NC-124, 1981). The scales were administered during a 90-120 minute maternal interview and home visit. The demographic characteristics included income, education and age. Socioeconomic status was calculated from maternal and paternal education and net family income. Maternal alienation was assessed by the mother's responses to the nine-item version of Srole's Anomia Scale (1956) which was found to be more reliable than the original five-item scale (Poresky and Atilano, 1981). Estimates of maternal and paternal extra-family involvement were based on the mother's estimate of the percentage of families, friends, and relatives whom they know and/or were in touch with during the last year. Parent-child involvement was the frequency of mother and/or father-child activities including sports events, movies, visits to friends and relatives, outings and trips taken during the last year. The 44-item Environmental Assessment Index was adapted from the Home Observation for Measurement of the Environment (Bradley and Caldwell 1976) for the older age range and rural settings of the target children. The home visitor scored each item "yes" or "no" based on either direct observation

or information from the child's mother. Each "yes" was scored 2 and each "no" was given a 1. The Environmental Assessment Index score was the sum of the 44 item scores. Its Chronbach Alpha reliability coefficient for this sample was 0.74 (sig. $p < .001$). Further information on the design of the study and the instruments is provided in the NC-124 Technical Report (NC-124, 1981).

Standardized intelligence tests were administered during the home visit. The Peabody Picture Vocabulary Test, form B, (PPVT) was administered to the 3-year-olds and the PPVT IQ score was used as the measure of their relative intellectual development. The Vocabulary, Information, Picture Completion, and Block Design subtests of the Wechsler Intelligence Scale for Children - Revised (Wechsler, 1974) were administered to the 6- and 9-year-olds during the home visit. An IQ estimate was generated from the four subtest scaled scores based on the parameters of the scaled scores and the IQ score.

RESULTS AND DISCUSSION

The children demonstrated above-average performance on the standardized measures of cognitive development, with a mean PPVT score for the 3-year cohort of 110 and mean WISC-R subtest scaled scores ranging from 11.2 through 14.1 with an average IQ estimate of 110.22 (SD = 16.37). The mothers' mean Anomia score was 10.88 (SD = 1.80). Scores on the Environmental Assessment Index ranged from 70 to 88, with a mean of 82.18 (SD = 3.96).

Since the literature supports the hypothesized positive

correlations between the ecological factors and intellectual development one-tailed significance levels are reported for the univariate correlations (Figures 1-3).

The most important findings are the relationships between home ecological factors and the children's mental development. Different patterns were found for 3-, 6-, and 9-year old children. The forward temporal cross-lagged correlation between initial home assessment at 3 years and later PPVT-I.Q. scores at age 5 was .66 ($p<.01$) while the concurrent third year synchronous correlation was only .26 (n.s.) for the age 3 cohort (see Figure 1). No other variable, including initial PPVT-IQ scores and a variety of measures of SES, showed the strength of the home assessment in accounting for later PPVT scores. The correlations between initial PPVT-IQ and SES with later PPVT-IQ were .38 (n.s.) and .43 (sig. $p < .05$). Thus the time-lagged effect of the young children's home environments was stronger than the other variables and even than its concurrent effect.

For the age 6 cohort the only significant forward correlation involved the Vocabulary subscale and the initial home assessment ($r=.41$, $p<.05$). Figure 2 shows the longitudinal correlations between the antecedent intelligence, home and family variables with the age 8 W.I.S.C.-R. subtest and I.Q. estimate scores.

Analysis of data from the age 9 cohort, seen at 9, 10 and 11 years of age, showed forward correlations between the initial home assessment index and later Vocabulary and Information scaled scores and I.Q. estimates ($r's=.67$, .63, and 54; $p<.01$). These correlations are presented in Figure 3. The measure of SES was also correlated with the WISC I.Q. estimate ($r = .58$, $p.<.01$).

Initial maternal alienation scores were inversely correlated with the age 11 WISC subtests and I.Q. estimate (r's=-.43, -.54, -.71, -.61, -.73, all $p<.05$). Maternal and paternal education were also correlated with the WISC-R IQ estimate ($r = +.52$, sig. $p < 0.05$ and +.55, sig. $p < .01$). Thus for the 9-10-11 year cohort a much more complete pattern of relationships is seen with maternal alienation showing the greatest longitudinal correlation.

The contents of the measures and the use of temporal cross-lagged correlation analysis to probe causality in non-experimental research designs were discussed. While the educational/developmental quality of the children's home environment was linked to the development of both the 3-year and 9-year old cohorts' intelligence, maternal alienation was only linked with effects on the older children. The variation in the correlations involving WICS-R subtests suggests a need to analyze environmental effects in terms of anticipated effects on specific aspects of intellectual functioning (at least verbal and performance aspects) of childhood. The linkage of maternal alienation for the older cohort, but not the younger, suggests variations in environmental influences on cognitive performance during a child's lifespan.

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NC-124 - Life Span Analysis of Rural Children's
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Figure One

3-4-5 Year Cohort

Cross-Lagged Correlations with Peabody Picture Vocabulary Test I.Q. Scores at Age 5

Age 3 Variable:	r
PPVT - IQ	.38+
Home Assessment Index	.66**
Socioeconomic Status	.43*
Anomia (powerlessness)	-.31
Maternal Education	.29
Paternal Education	.19

Note: Statisical significance levels +=.01; *=.05; **=.01; one-tailed tests.

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Figure Two

6-7-8 YEAR COHORT

Cross-lagged Correlations with Age 8

Wechsler Intelligence Scale for Children - Revised

Subtests and Estimated I.Q.

	W.I.S.C. - R. Subtests and Estimated I.Q. at age 8 years				
	Vocab.	Infor.	Pict. Comp.	Block Design	Estim. I.Q.
Age 6 Variables					
W.I.S.C.-R.					
Vocabulary	.06	.26	.28	.33	.32
Information	.06	.60**	.32	.19	.40+
Picture Completion	.27	.51*	.60**	.41*	.64**
Block Design	-.20	.07	.37	.52*	.25
Estimated I.Q.	.11	.49*	.48*	.41+	.52*
Home Assessment Index	.41*	-.14	.16	.21	.25
Socioeconomic Status	-.12	-.35+	-.28	-.19	-.33+
Anomia (powerlessness)	-.01	-.26	.20	.25	.08
Maternal Education	.28	.11	.15	-.02	.21
Paternal Education	-.27	-.21	-.08	-.12	-.24

Note: Statistical Significance levels: +=.10; *=.05; **=.01; ***=.001; one-tailed tests.

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Figure Three

9-10-11 YEAR COHORT

Cross-lagged Correlations with Age 11

Wechsler Intelligence Scale for Children - Revised

Subtests and Estimated I.Q.

	W.I.S.C. - R. Subtests and Estimated I.Q. at age 11 years				
	Vocab.	Infor.	Pict. Comp.	Block Design	Estim. I.Q.
Age 9 Variables					
W.I.S.C.-R.					
Vocabulary	.53**	.50*	.20	.40*	.51*
Information	.49*	.59**	.30	-.00	.40*
Picture Completion	.16	.37+	.38+	.58**	.49*
Block Design	.29	.43*	.43*	.84***	.67***
Estimated I.Q.	.53**	.67***	.46*	.71***	.76***
Home Assessment Index	.67***	.63**	.19	.30	.54**
Socioeconomic Status	.41+	.57**	.39+	.42+	.58**
Anomia (powerlessness)	-.43*	-.54**	-.71***	-.61**	-.73***
Maternal Education	.50*	.50*	.19	.45*	.52*
Paternal Education	.44*	.62**	.41*	.32	.55**

Note: Statistical Significance levels: +=.10; *=.05; **=.01; ***=.001; one-tailed tests.